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PATENT COOPERATION TREATY

PCT/IL2008/001492

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From the INTERNATIONAL BUREAU

NOTIFICATION CONCERNING TRANSMITTAL OF COPY OF INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (CHAPTER I OF THE PATENT COOPERATION TREATY)
(PCT Rule 44bis.1(c))

To:

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Date of mailing *(day/month/year)* 27 May 2010 (27.05.2010)	
Applicant's or agent's file reference 45192	**IMPORTANT NOTICE**

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/IL2008/001492	13 November 2008 (13.11.2008)	15 November 2007 (15.11.2007)

Applicant
SENG ENTERPRISES LTD. et al

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty)

The International Bureau of WIPO
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference 45192	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/IL2008/001492	International filing date *(day/month/year)* 13 November 2008 (13.11.2008)	Priority date *(day/month/year)* 15 November 2007 (15.11.2007)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant SENG ENTERPRISES LTD.		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☒	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

	Date of issuance of this report 18 May 2010 (18.05.2010)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Simin Baharlou
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Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
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PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	13 MAY 2009
Applicant's or agent's file reference 45192	FOR FURTHER ACTION See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/IL 08/01492	13 November 2008 (13.11.2008)	15 November 2007 (15.11.2007)

International Patent Classification (IPC) or both national classification and IPC
IPC(8) - C12M 3/00 (2009.01)
USPC - 435/305.2

Applicant SENG ENTERPRISES LTD.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/US	Date of completion of this opinion	Authorized officer:
Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	30 April 2009 (30.04.2009)	Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/237 (cover sheet) (April 2007)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/IL 08/01492

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

   a. type of material

      ☐ a sequence listing

      ☐ table(s) related to the sequence listing

   b. format of material

      ☐ on paper

      ☐ in electronic form

   c. time of filing/furnishing

      ☐ contained in the international application as filed

      ☐ filed together with the international application in electronic form

      ☐ furnished subsequently to this Authority for the purposes of search

4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/IL 08/01492

Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has, within the appicable time limit:

   ☐ paid additional fees

   ☐ paid additional fees under protest and, where applicable, the protest fee

   ☐ paid additional fees under protest but the applicable protest fee was not paid

   ☒ not paid additional fees

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

   ☐ complied with

   ☒ not complied with for the following reasons:

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: claims 1-11, 25-36 and 48-51, directed to a holding device for cells comprising an array of spaced picoliter wells, further wherein the holder may be translucent.
Group II: claims 12 and 13, directed to a method of forming a template for a picoliter well array.
Group III: claims 14-24 and 37-47, directed to a method of forming a cell holding device having an array of picoliter wells.

The inventions listed as Groups I - III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The special technical feature of the Group I claims is a holding device for cells comprising an array of spaced picoliter wells. The special technical feature of the Group II claims is a method of forming a template for a picoliter well array. These special technical feature of the Group III claims is a method of forming a cell holding device having an array of picoliter wells.

The only common technical element shared by the above groups is that they are related to an array of wells having picoliter volume. This common technical element does not represent an improvement over the prior art of US 2004/0219074 A1 to Childers et al. (see para [0015], [0028]) Therefore, the inventions of Groups I-III lack unity of invention under PCT Rule 13 because they do not share a same or corresponding special technical feature.

4. Consequently, this opinion has been established in respect of the following parts of the international application:

   ☐ all parts

   ☒ the parts relating to claims Nos. 1-11, 25-36 and 48-51

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/IL 08/01492

Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-6, 11, 34-36	YES
	Claims	7-10, 25-33, 48-51	NO
Inventive step (IS)	Claims	NONE	YES
	Claims	1-11, 25-36, 48-51	NO
Industrial applicability (IA)	Claims	1-11, 25-36, 48-51	YES
	Claims	NONE	NO

2. Citations and explanations:

Claims 7-10 lack novelty under PCT Article 33(2) as being anticipated by US 2005/0277125 A1 to Benn, et al. (hereinafter "Benn").

As to claim 7, Benn discloses a holding device (para [0076]-[0077]) for studying cells (para [0113]) comprising at least two defined regions (para [0142]; Fig 31):
(a) a pico liter well array region including a plurality of pico liter wells (para [0280]; Fig 6); and
(b) a non-cell holding region (para [0068]; Fig 6, part 64) in fluid communication (para [0159]; Fig 31) with said pico liter well region (para [0280]), wherein fluid can be one or both added and removed from said non cell holding region without disturbing cells in said picowells (para [0081]-[0082]).

As to claim 8, Benn further discloses at least one fluid permeable (para [0099], [0110], disclosing porous reaction surfaces) barrier (para [0159], disclosing a blind hole; Fig 31, part 98) between said regions (Fig 31, part 98).

As to claim 9, Benn further discloses where the non-cell holding array has an embossed design (para [0170]).

As to claim 10, Benn further discloses where the pico liter well array is embossed (para [0170]).

Claims 25-33 and 48-51 lack novelty under PCT Article 33(2) as being anticipated by WO 2005/007796 A2 to Deutsch, et al. (hereinafter "Deutsch").

As to claim 25, Deutsch discloses a holding device (pg 6, ln 27-28, disclosing a holder) for studying cells (pg 1, ln 4-5) comprising:
- at least one cavity (pg 50, ln 14-19, disclosing picowells) adapted to receive a sample of cells (pg 49, ln 20-30) in a medium consisting essentially of water (pg 49, ln 3-19, disclosing 99% water solutions),
- the cavity having a substrate (pg 11, ln 25-31) and a generally inert wall (pg 10, ln 18-26, disclosing a wall made of ceramic, metals, plastics, or rubber),
- wherein the substrate includes a surface for receiving the medium (pg 12, ln 1-15), and
- wherein the surface includes a multiplicity of pico liter wells (pg 12, ln 1-15; Fig 10A-10C) and is characterized in that
- the substrate is substantially translucent (pg 17, ln 19-26) and
- has a refractive index equal to the refractive index of the medium (pg 12, ln 1-15).

As to claim 26, Deutsch further discloses where the medium comprises water (pg 49, ln 3-19, disclosing 99% water solutions) and wherein the substrate has a Refractive Index of 1.33 (pg 12, ln 10-15).

As to claim 27, Deutsch further discloses where the substrate is moldable (pg 33, ln 16-20, disclosing a device made through molding).

As to claim 28, Deutsch further discloses where the substrate is inert (pg 45, ln 4-14).

As to claim 29, Deutsch further discloses where the holding device is a carrier plate (pg 6, ln 24 to pg 7, ln 3) and wherein a first adhesive is disposed between the carrier plate and the substrate (pg 43, ln 5-11; Fig 15A-15C).

As to claim 30, Deutsch further discloses a second adhesive disposed between the generally inert wall and the substrate (pg 42, ln 20-28; Fig 14A-14C).

As to claim 31, Deutsch further discloses where at least one of the substrate, the first adhesive and the second adhesive are UV-light curable (pg 42, ln 20-28, disclosing light-curable adhesive 3051).

As to claim 32, Deutsch further discloses where the first adhesive and the second adhesive are acrylic (pg 42, ln 20-28, disclosing light-curable adhesive 3051, an acrylic adhesive).

**********See Supplemental Sheet to continue**********

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/IL 08/01492

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of:
BOX V(2):

As to claim 33, Deutsch further discloses a light source transmitting the UV-light through a bottom surface of the at least one cavity (pg 42, ln 20-28; Fig 14B).

As to claim 48, Deutsch discloses a holding device (pg 6, ln 27-28, disclosing a holder) for studying cells (pg 1, ln 4-5) comprising:
- a layer (pg 12, ln 1-15) of substantially transparent substrate material (pg 17, ln 19-26);
- having a multiplicity of pico liter wells (pg 12, ln 1-15; Fig 10A-10C);
- having a refractive index of 1.33 (pg 12, ln 10-15); and,
- a wall structure attached to the substrate (Fig 15A-15C).

As to claim 49, Deutsch further discloses where the substrate is UV-light curable (pg 13, ln 8-20; pg 39, ln 12-18).

As to claim 50, Deutsch further discloses a first adhesive disposed between the wall structure and the substrate (pg 43, ln 5-11; Fig 15A-15C).

As to claim 51, Deutsch further discloses
- a substantially transparent carrier plate (pg 6, ln 23-27; pg 17, ln 19-26; Fig 13-16);
- having a plurality of cavities (pg 50, ln 14-19, disclosing picowells) surrounded by walls formed in a first surface of the carrier plate (Fig 13-16),
- wherein the layer of substantially transparent substrate material is disposed on the carrier plate (pg 6, ln 23-27; pg 17, ln 19-26; Fig 13-16).

Claims 1-6 and 11 lack an inventive step under PCT Article 33(3) as being obvious over Benn in view of US 2005/0026299 A1 to Bhattacharjee, et al. (hereinafter "Bhattacharjee").

As to claim 1, Benn discloses a holding device (para [0076]-[0077]) for studying cells (para [0113]) comprising a spaced apart (para [0279]) pico liter wells (para [0280]). Benn does not specifically disclose a plurality of arrays. Bhattacharjee discloses a holding device for studying cells (Abstract; para [0066]) comprising a plurality of arrays (para [0007]; Fig 4, 5, 11B). It would have been obvious to a skilled artisan to combine the Benn and Bhattacharjee disclosures by using a plurality of the arrays taught by Benn on a holder. A skilled artisan would have been motivated to combine the references by the Bhattacharjee disclosure, suggesting such a configuration will provide benefits in fluid handling (para [0008]).

As to claim 2, Benn further discloses where the pico liter well arrays comprise embossed regions (para [0170]).

As to claim 3, Benn further discloses pico liter well arrays (para [0280]). Bhattacharjee further discloses at least one barrier (para [0049], disclosing scores; Fig 11B) between two arrays (Fig 11B).

As to claim 4, Benn further discloses where the arrays are arranged in a two dimensional repeating pattern (para [0295]; Fig 19).

As to claim 5, Bhattacharjee further discloses where the arrays include at least two different well array designs (para [0011]; Fig 1, 2).

As to claim 6, Benn further discloses where the device includes at least one non-well embossed region (para [0158], disclosing a transfer plate) fluidically connected to at least one of said arrays (para [0159]).

As to claim 11, Benn further discloses pico liter well arrays (para [0280]). Benn does not specifically disclose a plurality of well array regions. Bhattacharjee discloses a holding device for studying cells (Abstract; para [0066]) comprising a plurality of well array regions (para [0007]; Fig 4, 5, 11B). It would have been obvious to a skilled artisan to combine the Benn and Bhattacharjee disclosures by using a plurality of the array regions taught by Benn on a holder. A skilled artisan would have been motivated to combine the references by the Bhattacharjee disclosure, suggesting such a configuration will provide benefits in fluid handling (para [0008]).

Claims 34 and 35 lack an inventive step under PCT Article 33(3) as being obvious over Deutsch in view of US 4,684,538 A (Klemarczyk).

As to claim 34, Deutsch does not specifically disclose where the substrate is exposed to UV-light under vacuum pressure. Klemarczyk discloses an adhesive that is attached to a substrate (col 1, ln 50-62), where the adhesive is cured by exposing it to the UV-light (col 13, ln 62 to col 14, ln 4) under vacuum pressure (col 14, ln 7-25). It would have been obvious to a skilled artisan to combine the Deutsch and Klemarczyk disclosure by curing the adhesive taught by Deutsch under UV light and vacuum pressure. A skilled artisan would have been motivated to combine the references by the Deutsch disclosure, suggesting the use of a light-curable adhesive (pg 42, ln 20-28).

As to claim 35, neither Deutsch nor Klemarczyk specifically discloses where the vacuum pressure is in the range of 0.3-0.5 mmHg. However, such a range would have been obvious to a skilled artisan practicing the Deutsch and Klemarczyk disclosures through normal experimentation. A skilled artisan would have been motivated to use such a range in order to cure certain adhesives with different properties than those disclosed by Klemarczyk.

**********See the following Supplemental Sheet to continue**********

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/IL 08/01492

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:
BOX V(2) and the preceeding Supplemental Sheet:

Claim 36 lacks an inventive step under PCT Article 33(3) as being obvious over Deutsch in view of US 3,558,387 A to Bassemir, et al (hereinafter "Bassemir").

As to claim 36, Deutsch does not specifically disclose where the substrate is exposed to the UV-light under inert gas. Bassemir discloses a curing adhesive (col 4, ln 58-69) where an adhesive is exposed to the UV-light (col 2, ln 52-58) under inert gas (col 3, ln 65-68). It would have been obvious to a skilled artisan to combine the Deutsch and Bassemir disclosures by using method disclosed by Bassemir with the light-curing adhesive taught by Deutsch. A skilled artisan would have been motivated to use such a method by the Bassemir disclosure, suggesting that curing the adhesive in an inert atmosphere reduces curing time (col 4, ln 32-34).

Claims 1-11, 25-36, and 48-51 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used in industry.